

Remarks

Claims 1, 3, 4, 8-18 and 20 are pending and are under consideration.

Claims 1 and 17 are amended.

Claims 1 and 17 are amended to require that the weight ratio of components c) to b) is from 1:10 to 1:2. Support is found in the specification, page 12, third and fourth paragraphs. The weight levels of 0.1% surfactant to 1% filler and 7.5% surfactant to 15% filler are employed to arrive at these ratios.

No new matter is added.

Claims 1, 3, 4, 8-18 and 20 are rejected under 35 USC 112, first paragraph, as failing to comply with the written description requirement.

Applicants respectfully rebut these rejections.

The Examiner states that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors had possession of the claimed invention at the time of filing.

The present claims have previously been amended to include the limitation that the filler is "not an organically modified clay". Applicants submit that this negative limitation is supported by the present disclosure.

Organically modified clays are described in the present specification as clays that are modified with alkyl or dialkyl ammonium ions or amines or onium ions, page 1, second paragraph.

It is stated on page 1, third paragraph, that "These conventional organic modified clays have a number of disadvantages when used for the preparation of polyolefin nanocomposites."

It is stated on page 3, second full paragraph that "...known methods using organically...modified clays for the preparation of polyolefin nanocomposites do not in every respect satisfy the high requirements to be met...".

Page 3, third full paragraph states: "There is therefore still a need to find an efficient process for the preparation of polyolefin nanocomposites that provide the properties of interest but do not have the disadvantages mentioned above and which allows the use of a natural filler which has not been modified before use." (emphasis added)

Page 39, first full paragraph (Example 8) states: "The viscosity of the samples is slightly reduced with respect to polypropylene. Conventional organic modified clays and derived nanocomposites have significantly increased viscosity. The nanocomposites of the present invention are more readily processed than conventional nanocomposites based on organic modified clays." (emphasis added)

Further, present Examples 1-10 on pages 29-43 exclusively use non-modified fillers CLOSITE Na⁺, SOMASIF ME 100 or hydrotalcite.

Example 11 on pages 43-44 shows a comparison between a nanocomposite containing a modified organoclay CLOSITE 20A and an unmodified filler SOMASIF ME 100. The nanocomposite with the unmodified filler displays better oxygen permeability.

Data sheets for CLOSITE Na⁺ and CLOSITE 20A are attached herewith. A copy of Vlasfeld, et al., Polymer 46 (2005) 3452-3461 is also attached. Section 2.1.6 of Vlasfeld describes SOMASIF ME 100 as a synthetic unmodified layered silicate.

These references are submitted together with a PTO form 1449 citing each reference. The Examiner is kindly requested to indicate that each reference is considered by returning an initialed copy of PTO form 1449.

Applicants submit that in light of these disclosures that the inventors had full possession of the invention as represented by the claims in their present form at the time of filing. The inventors clearly

disclose a preference for non-organically modified clays. The negative limitation of the present claims simply limits the claims to a preferred embodiment.

Applicants also state the present claims represent one among several embodiments of the present invention. The prior amendments are not to be construed as a waiver of Applicants' rights to file further continuation applications aimed at the use of modified clays.

Claims 1, 3, 4, 8-14 and 16-18 are rejected under 35 USC 102(e) as being anticipated by Rosenthal, et al., U.S. Pat. No. 6,864,308.

Claim 20 is rejected under 35 USC 103(a) as being unpatentable over Rosenthal in view of Sun, U.S. Pat. No. 5,912,292.

Claim 15 is rejected under 35 USC 103(a) as being unpatentable over Rosenthal in view of Mehta, et al., U.S. Pat. No. 6,844,389.

Rosenthal is cited as teaching melt blending a polyolefin, a smectite clay and an intercalating agent such as sorbitan monostearate or sorbitan tristearate. Rosenthal mentions that the smectite clay can be untreated or it can be modified with a swelling agent, col. 2, lines 33-34.

However, Applicants submit that Rosenthal only very generically mentions untreated clay. All of the working Examples therein employ a modified organoclay, CLOSITE 20A, except for sample 2 of Example 6. Example 6 therein compares composites containing ammonium modified clay with those containing an unmodified montmorillonite, using ethylene-bis-stearamide as intercalating agent/surfactant and polypropylene as the polymer matrix. This comparison shows that the nanocomposites obtained with the unmodified clay contain "a poorer dispersion of the untreated clay", col. 9, line 62. The Example thus appears to lead away from the present invention.

There is no teaching of any kind given by Rosenthal to pick from all clay materials given in this document an unmodified one, to pick sorbitan monostearate or sorbitan tristearate as a specific example of an hydroxy ester among the 4 classes of intercalating agents listed, col. 2, lines 58-66 or Example 4, and combine these subjects. This appears to be especially true since the results of Example 6 therein does not give rise to any reasonable expectation of success.

A further difference over Rosenthal is the ratio of intercalating agent to clay required; Rosenthal uses high amounts of the intercalating agent relative to clay. While the general specification notes that this ratio is at least 1:3, col. 3, lines 4-5, a ratio of 3:2 is shown in the only example using an unmodified clay (sample 2 of Example 6). It is noted that all other examples employ an organoclay which contains a further intercalating agent, an ammonium compound, and the composite products thus contain that organic filler in addition to the intercalating agent.

In contrast to Rosenthal, the specific combination found in the present invention allows for the use of much lower amounts of surfactant, see the present Examples using surfactant/clay ratios ranging from 1:2 to 1:5. In general, the present specification teaches dosages of components b) and c) independently, each in relation to the polyolefin. Comparing the high ends of these dosage ranges (paragraphs 3 and 4 of present page 12) gives, in agreement with the present Examples, preferred weight ratios of surfactant to filler ranging from 1:10 to 1:2 (i.e. 0.1:1 to 7.5:15).

Applicants submit that in light of the above discussion and the present amendments, that the 35 USC 102(e) and 35 USC 103(a) rejections are addressed and are overcome.

In view of all of the above, Applicants submit that each of the claim rejections are addressed, by and are overcome.

The Examiner is kindly requested to reconsider and to withdraw the present rejections.

Applicants submit that the present claims are now in condition for allowance and respectfully request that they be found allowable.

Respectfully submitted,



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Attachments: Petition for a 1 month extension of time
Request for Continued Examination
CLOSITE Na⁺ and CLOSITE 20A data sheets
Vlasfeld, et al., Polymer 46 (2005) 3452-3461
PTO form 1449